

REMARKS:

- 1) Please enter the enclosed Substitute Specification and Abstract (clean version) to replace the original Specification and Abstract. The enclosed marked-up version of the Substitute Specification and Abstract shows all the changes relative to the prior version of record. The Substitute Specification includes no new matter. The originally filed literal translation of the corresponding German text of the PCT international application has been revised in an editorial manner. The editorial revisions avoid the effects of a literal translation and are supported by the context and by the disclosure of original Figure 2 showing that the control circuit 2.2 is part of the cover 2. Thus, the editorial revisions do not contain any new matter. Further, the editorial revisions conform the terminology used in the specification to the terminology now used in new US claims 23 to 33. Entry of the editorial revisions into the specification is respectfully requested.
- 2) The Replacement Sheet of drawings does not show any "closed loop" because this term is no longer used in the new US claims 23 to 33.
- 3) The new claims 23 to 33 are based on the original claims and on the original disclosure particularly Fig. 2 and page 3 lines 18 and 19 of the specification. This original disclosure shows that the control module, namely the control circuit 2.2, is embodied so that it forms the lid or cover of the electromechanical sub-

assembly. This feature is now emphasized in independent claim 23. The new claims are based on the original claims approximately as follows.

new claims	23	24	25	26	27	28	29	30	31	32	33
original claims	1 + 17 p.3, l.18 + 19 and Fig.2	2	3 or 13	4 or 14	5 or 15	6 or 16	8 or 18	10 or 20	11 or 21	12 or 22	Fig.2

The new claims do not contain any new matter. Entry of the new claims is respectfully requested.

- 4) Referring to sections 3 and 4 on page 3 of the Office Action, the rejection of claims 1, 2 and 13 to 22 under 35 U.S.C. § 112(2) is respectfully traversed. The new claims have been drafted to avoid the pitfalls of a literal translation. The new claims 23 to 33 avoid the rejection on formal grounds. Further, as stated above, the formation of a closed loop is no longer part of the claims. Withdrawal of the rejection under 35 U.S.C. § 112(2) is respectfully requested.
- 5) Referring to sections 5 and 6 on pages 3, 4 and 5 of the Office Action, the rejection of claims 1 and 2 and 13 to 22 under 35 U.S.C. § 102(b) as being anticipated by US Patent 5,941,282 (Suzuki et al.) is respectfully traversed for the following reasons.

- 6) New claim 23 makes it clear that the present sub-assembly comprises a cover 2 which in turn comprises the electrical control circuit 2.2 forming (together with the cover) a control module for controlling the at least one electrically controllable component (6).
- 7) Contrary to the invention as claimed in new claim 23 and in claims 24 to 33 depending from claim 23, Suzuki et al. clearly show that the circuit board 50 with its integrated circuit components IC is a separate item not forming an integral part of the cover 70. Therefore, Suzuki et al. cannot anticipate present claims 23 to 33. Withdrawal of the rejection under 35 U.S.C. § 102(b) is respectfully requested.
- 8) With regard to present claim 24, previously claim 2, assuming that the printed circuit board 50 of Suzuki et al. is made of an electrically non-conducting material, then the Examiner's position is true that the housing 30 of Suzuki et al. literally "contains an electrically non-conducting material". However, Suzuki et al. do not disclose that the housing 30 itself comprises an electrically non-conducting or insulating material.
- 9) With regard to claim 25 (previously claim 13) the Office Action admits that Suzuki et al. do not show any "pressed screen". In this connection the term "pressed screen" was a literal translation of the German term "Stanzgitter". A more appropriate translation is "stamped grid" or "stamped grid structure" as now set forth in claim 25. The grid structure is electrically

conducting and Suzuki et al. do not show anything in this respect.

- 10) With regard to claim 26 (previously claim 14) no independent protection is intended for merely a general body that has a cuboidal shape or has rectangular sides.
- 11) With regard to claim 27 (previously claim 15) Suzuki et al. do not show any connection of three modular components to each other as claimed in present claim 27. Suzuki et al. merely disclose that the valve assembly 40 is connected by screws 42 passing through holes 41 to the housing 30. The holes 51 in the printed circuit board 50 are for passing through electrical conductors, please see column 3 last paragraph to column 4 first paragraph of the Suzuki et al. disclosure. Suzuki et al. disclose that the circuit board 50 and the valves 10, 12 are mounted in the housing 30. The housing 30 is closed on top by the cover 70 and the bottom of the housing 30 is closed by the valve body 20. Suzuki et al. do not disclose the concept of integrating the control circuit with the cover, nor the concept of providing different types of holes for different connecting purposes.
- 12) With regard to claim 28 (previously claim 16), Suzuki et al. do not disclose any of the features claimed in combination in present claim 28 because the printed circuit board 50 carrying the integrated circuit IC cannot be made of a "metalliferous material". That is so, because any printed circuit IC is inoperable when it is printed on a conducting board due to short

circuits caused by the conducting board. The present printed circuit board (2.3) is made of an electrically insulating material which is integrated to or secured to the metallic cover 2 which simultaneously functions as a cooling element for the printed circuits 2.2. No such structure is shown by Suzuki et al.

- 13) With regard to claim 29, Suzuki et al. do not show any sensors much less sensors as part of the support module (3). Actuators for the electromagnetic valves 10 of Suzuki et al. are also not disclosed by Suzuki et al.
- 14) With regard to claim 30, no independent protection is sought for a waterproof housing.
- 15) The closed loop feature of claims 18 and 19 has been canceled.
- 16) With regard to claim 31, no independent protection is sought for an electrical connector as shown at 33 in the Suzuki et al. disclosure. Similarly, no independent protection is sought for the features of present claims 32 and 33.

**[RESPONSE CONTINUES ON NEXT PAGE]**

- 17) Favorable reconsideration and allowance of the application,  
including all present claims 23 to 33, are respectfully  
requested.

Respectfully submitted,  
Hermann PIRNER et al.  
Applicant

WFF:he/4883

Enclosures:

Transmittal Cover Sheet

Drawing Transmittal

1 Replacement Sheet

Sub. Spec. marked-up version

Sub. Spec. clean version

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Walter F. Fasse 9/13/06  
Name: Walter F. Fasse - Date: September 13, 2006

In the Drawings:

Please replace the originally filed Drawing Sheet having Figures 1 and 2 with the enclosed "Replacement Sheet". Reference number 5 designates a symbolically shown sensor in Figs. 1 and 2 of the enclosed Replacement Sheet. New matter is not involved because the sensor 5 has been disclosed on page 6 line 2 of the original specification.

**[RESPONSE CONTINUES ON NEXT PAGE]**



Docket No. 4883  
App. No. 10/540,000

SUBSTITUTE SPECIFICATION AND ABSTRACT (Marked-Up Version)

Description

Title of the Invention

Electromechanical ~~sub-assembly~~ subassembly

5 Field of the Invention

The invention relates to an electromechanical ~~sub-assembly~~ subassembly of electronic and mechanical components ~~according to the preamble of patent claim 1.~~

Background Information

10 ~~Sub-assemblies~~ Subassemblies, which are produced and distributed as intermediates, as a rule are equipped with customized specific features. In case of ~~sub-assemblies~~ subassemblies with electronic components these are e.g. the electrical connection device of the electronic component, via which the electronic  
15 component is connected by means of a customized connection element for instance to a power supply or to a control device assigned to the electronic ~~sub-assembly~~ subassembly.

In this case adaptation of the ~~sub-assembly~~ subassembly to the customized features in its production results in that several

housings differing for instance in said electrical connection devices, must be produced for receiving the electronic component. Thus, the number of the housings to be produced identically is reduced, whereby the production costs for the ~~sub-assembly~~ subassembly highly increase.

### Summary of the Invention

It is the object of the invention to indicate an electromechanical ~~sub-assembly~~ subassembly, in which the housing is embodied to be compatible ~~[[to]]~~ with different housing variants in terms of its internal and external contact terminals and which ~~even though~~ nevertheless can be produced at low costs. Moreover, the components and partial components ~~pertaining to forming part of~~ the electromechanical ~~sub-assembly~~ subassembly should ~~[[to]]~~ be combinable as compact as possible.

This object ~~[[can be]]~~ has been achieved in accordance with the invention by an electromechanical ~~sub-assembly~~ subassembly with the features ~~of patent claim 1.~~ set forth herein.

Accordingly, an electromechanical ~~sub-assembly~~ subassembly is provided with a cover constructed as a control module equipped with first contacts, a mechanical module with second contacts, a support module for ~~fixing~~ securing the control module cover and the mechanical ~~module,~~ module to the support module, said support module comprising first terminals for contacting the first contacts, second terminals for contacting the second contacts and

at least one connection device or electrical connector for contacting the electromechanical ~~sub-assembly~~ subassembly.

The present electromechanical ~~sub-assembly embodied~~ subassembly constructed in this way can be produced at low costs, ~~[[as]]~~ because the support module forming the housing can be simply produced with different terminals or electrical connecting structures such as female and male connector strips. ~~Here, the~~ The cover forming the control module, the mechanical module and the support module are combined in compact manner, whereby for example maintenance works can be easily performed.

~~Advantageous embodiments and further improvements can be taken from the sub-claims and the description taken in conjunction with the drawing.~~

In a further embodiment of the invention it is provided that the support module forms a body, into which ~~pressed~~ stamped screens or grids are incorporated. These ~~pressed~~ stamped screens or grids form the electrical connections within the electromechanical ~~sub-assembly~~ subassembly, i.e. between the at least one ~~connection device,~~ electrical connector, the first terminals and the second terminals. ~~Here, the~~ The support module is manufactured of an electrically non-conductive material.

In a further improvement of the invention it is provided that the electromechanical ~~sub-assembly~~ subassembly composed of the cover control module, the mechanical module and the support module

comprises an approximately cuboidal structural shape. In the corners of the electromechanical ~~sub-assembly~~ subassembly four recesses or holes for joining elements, e. g. screws, are placed. Two of the recesses are embodied as a ~~screwing~~ threaded hole for interconnecting the cover control module, the mechanical module and the support module. The other two recesses are embodied as a fixing hole for ~~fixing~~ securing the electromechanical ~~sub-assembly~~ subassembly for example to a truck.

The cover control module ~~consists~~ is made of a ~~thermal~~ thermally conductive metal, onto which a circuit arrangement comprising the first contacts is mounted.

The control module is embodied such that it forms the lid or cover of the electromechanical ~~sub-assembly~~ subassembly.

In a further improvement of the invention it is provided that in the mechanical module ~~[[actors]]~~ actuators and sensors are arranged, which form a closed loop control circuit.

The electronic control of the closed loop control circuit is advantageously ~~arranged~~ included in the circuit arrangement of the cover control module.

In a further improvement of the invention it is provided that the cover control module, the mechanical module and the support module in their assembled state form a housing which is waterproof ~~towards periphery~~.

In a typical embodiment of the invention at least one of the connection devices or electrical connectors forms an external terminal of the electromechanical ~~sub-assembly~~ subassembly.

In a typical embodiment of the invention the terminals and contacts respectively form ~~a terminal block or a contact block~~ female and male connector strips, wherein a respective ~~contact block~~ female connector strip can be assembled with the ~~terminal block~~ associated ~~[[to it]]~~ male connector strip in accordance with the key-lock-principle.

#### Brief Description of the Drawings

The invention is explained in detail in the following text taken in conjunction with the ~~examples of~~ example embodiment ~~indicated~~ illustrated in the figures of the ~~drawing.~~ drawing, wherein:

Fig. 1 shows a view of the ~~composed~~ assembled electromechanical ~~sub-assembly~~ subassembly comprising the cover control module, the mechanical module and the support module, and

Fig. 2 shows ~~[[a]]~~ an exploded view of the individual electromechanical ~~sub-assembly~~ subassembly components comprising the cover control module, the mechanical module and the support module.

~~In all figures of the drawing like or function like elements and parts as far as not noted otherwise refer to identical reference numerals.~~

5 Detailed Description of a Preferred Example Embodiment and of the Best Mode of the Invention

10 ~~[[In]]~~ Fig. 1 shows the completely assembled components of the present electromechanical sub-assembly subassembly 1 is shown, which ~~comprises~~ comprising a cover control module 2, a support module ~~[[4]]~~ 3 and a mechanical module ~~[[3]]~~ 4. The electromechanical ~~sub-assembly subassembly~~ 1 serves for controlling the pressure of a pneumatic ~~facility~~ system of a truck.

15 ~~[[With]]~~ In this embodiment ~~[[in]]~~ the mechanical module 4 is made of cast ~~aluminum sensors a contained,~~ which aluminum. Sensors 5 secured for example to the support 3, measure the pneumatic pressure ~~[[in]]~~ of the facility pneumatic system. Moreover, an ~~[[actor]]~~ actuator 6 is contained in the mechanical ~~module, which~~ module 4. The actuator 6 is embodied as a valve, which allows ~~[[the]]~~ compressed air to ~~deflate.~~ be vented.

20 ~~At the support module 3 a~~ A connection device such as an electrical connector 3.3 is embodied, via which secured to the support module 3. The electrical connector 3.3 connects all electronic components of the electromechanical ~~sub-assembly subassembly 1 are connected~~ to a power supply, and ~~via which~~

supply. The connector 3.3 also connects the electromechanical  
sub-assembly subassembly is connected 1 to further electrical  
components of the truck, i.e. a compressor not shown. The  
support module 3 was manufactured by plastics spraying an  
injection molding method using a synthetic material which is  
electrically non-conductive. The connection device electrical  
connector 3.3 is embodied made in accordance with the  
specifications of the truck manufacturer.

[[In]] Fig. 2 shows the components 2, 3 and 4 of the  
electromechanical sub-assembly subassembly 1. are shown. The  
cover control module 2, the support module 3 and the mechanical  
module 4 are interconnected by screws 8, which are formed pass  
through respective holes 9.1 at two opposite corners of the  
electromechanical sub-assembly subassembly 1 which [[is]] has  
substantially rectangular sides. For this purpose two screwing  
of the holes 9.1 of a smaller diameter are placed in the  
electromechanical sub-assembly subassembly preferably threads are  
threaded holes. Preferably, the threaded holes 9.1 for the  
screws 9 being 8 are placed in the mechanical module 4 as shown.  
The two remaining corners of the electromechanical sub-assembly  
subassembly comprise fixing through holes 9.2 with a larger  
suitable diameter, which serve for fixing securing the  
electromechanical sub-assembly subassembly 1 to [[the]] a truck.

The cover with its control module 2 consists is made  
substantially of an aluminum plate, onto which a plate. A  
control circuit arrangement 2.2 is arranged on a printed circuit

board or a ceramic ~~[[body]]~~ plate 2.3 is secured to the inner  
surface of the cover control module 2. This circuit has been  
mounted for example ~~[[in]]~~ by SMD technology (surface mounted  
device) on a printed circuit board basis or ~~[[in]]~~ by a hybrid  
technology. The control circuit arrangement 2.2 comprises the  
closed loop control of the pneumatic ~~facility~~ system, for example  
a proportional closed loop control. Within this closed loop the  
actual value of the pneumatic pressure ~~determined~~ , as sensed by  
the sensor 5, is compared with a nominal or rated pressure value  
which is dependent e.g. from the operating state of the truck.  
In case the nominal value is exceeded, for instance the ~~[[actor]]~~  
actuator 6 ~~formed as a drain constructed as a venting valve is~~  
~~opened, in case of falling~~ opened. If the sensed actual pressure  
is below the nominal or rated value the compressor of the truck  
is activated.

The circuit arrangement ~~[[2.1]]~~ 2.2 of the cover control module  
2 mounted on the ceramic body 2.3 comprises a first female  
contact ~~[[block]]~~ strip 2.1, via which with several contacts for  
connecting the circuit arrangement ~~2.1 is connected~~ 2.2 to  
ground, to a supply voltage and to signal lines.

~~At the mechanical module 4 a~~ A second female contact ~~[[block]]~~  
strip 4.1 is formed, via which the actors secured to the  
mechanical module 4. The contact strip 4.1 has several contacts  
for connecting the actuators 6 and the sensors 5 are connected  
to ground, to a supply voltage and to signal lines.

When installing the electromechanical ~~sub-assembly~~ subassembly  
1 the first female contact ~~[[block]]~~ strip 2.1 of the cover  
control module 2 is connected to the first male terminal  
~~[[block]]~~ or connector strip 3.1 of the support module 3.  
5 Likewise, the second contact ~~[[block]]~~ strip 4.1 of the  
mechanical module 4 is connected to a second male terminal  
~~[[block]]~~ or connector strip 3.2 of the support module 3. The  
first male terminal ~~[[block]]~~ strip 3.1 and the second male  
terminal ~~[[block]]~~ strip 3.2 are connected to a pressed stamped  
10 screen or grid 3.4 ~~cast into~~ embedded in the support module 3,  
~~which 3.~~ The grid 3.4 forms the contacts of ~~a connection device~~  
~~3.3.~~ The ~~connection device 3.3~~ is formed an electrical connector  
3.3 made in accordance with the specifications of the truck  
manufacturer, ~~wherein a~~ manufacturer. A plug-in device (not  
15 shown) can be pushed ~~[[onto]]~~ into the ~~connection device~~  
electrical connector 3.3.

For sealing the electromechanical ~~sub-assembly~~ subassembly  
~~[[+1]]~~ 1 against penetration of water, grooves can be formed for  
example in the support module ~~[[+3]]~~ 3 on the sides facing the  
20 cover control module ~~[[+2]]~~ 2 and the mechanical module ~~(+4)~~ one  
4. These grooves are circumferential ~~groove each can be formed,~~  
~~into which grooves and~~ an o-ring not shown is ~~inserted.~~ inserted  
into each groove.

The possibility that only the support module 3 is to be adapted  
25 to the customer's need allows that the electromechanical  
~~sub-assembly~~ subassembly 1 can be produced at low costs. By the

modular construction, which can be ~~dismounted~~ easily disassembled  
in ~~easy manner~~, maintenance works ~~[[at]]~~ on the electromechanical  
~~sub-assembly~~ subassembly can be simply performed.

In summary, one can say that by means of the electronic control  
cover sub-assembly subassembly 2 embodied as described, a very  
high degree of compatibility with the most different ~~sub-assembly~~  
subassembly variants can be achieved in a very simple, but  
nevertheless very effective manner, without having to ~~renounce~~  
~~on~~ forego the possibility of a cost-efficient and simple  
production.

~~The present invention has been presented based on the above  
description such that the principle of the invention and its  
practical application is explained best possible, however, as a  
matter of course the invention can be realized in diverse other  
forms of embodiment if modified appropriately.~~

Although the invention has been described with reference to  
specific example embodiments, it will be appreciated that it is  
intended to cover all modifications and equivalents within the  
scope of the appended claims. It should also be understood that  
the present disclosure includes all possible combinations of any  
individual features recited in any of the appended claims.

~~List of reference numerals~~

~~1 Electromechanical sub-assembly~~

~~2 Control module~~

~~2.1 First contact block~~

~~2.2 Circuit arrangement~~

~~2.3 Ceramic body, printed circuit board~~

~~3 Support module~~

~~3.1 First terminal block~~

~~3.2 Second terminal block~~

~~3.3 Connection device~~

~~3.4 Pressed screen~~

~~4 Mechanical module~~

~~4.1 Second contact block~~

~~5 Sensors~~

~~6 Actors~~

~~7 Pneumatic terminal~~

~~8 Screws~~

~~9.1 Screwing hole~~

~~9.2 Fixing hole~~

ABSTRACT OF THE DISCLOSURE

~~The invention relates to an~~ An electromechanical ~~sub-assembly~~  
subassembly ~~comprising~~ has a cover control module equipped with  
a printed circuit and with first contacts, a mechanical module  
5 equipped with second contacts and a support module for ~~fixing~~  
securing the cover control module and the mechanical module to  
the support module. The support module ~~comprises~~ includes first  
electrical terminals for contacting the first contacts, second  
electrical terminals for contacting the second contacts and at  
10 least one ~~connection device~~ electrical connector for contacting  
the electromechanical ~~sub-assembly~~ subassembly and the control  
circuit forming part of the cover.